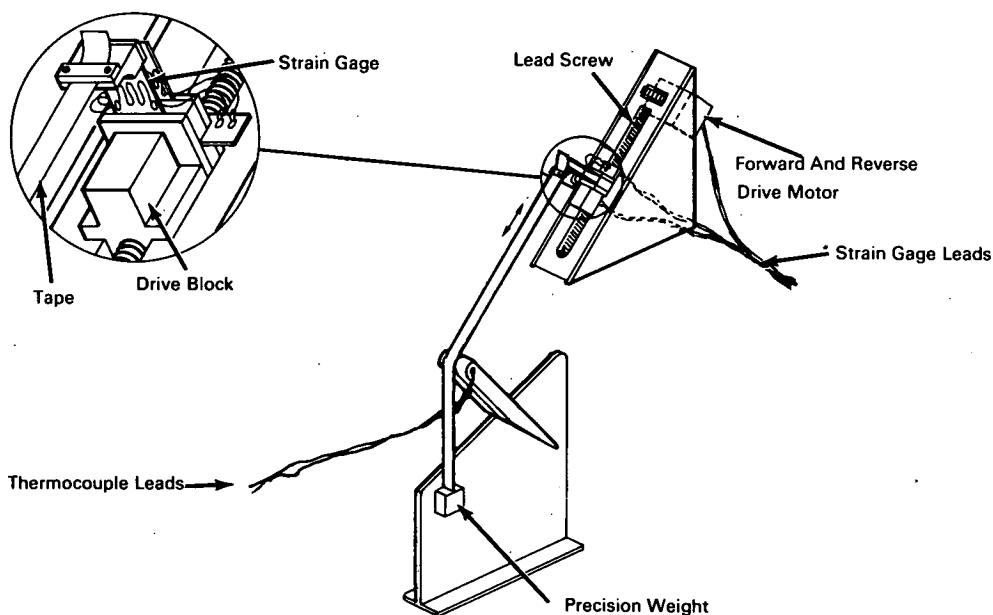


NASA TECH BRIEF



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Device Measures Static Friction of Magnetic Tape



The problem:

To design a device that will accurately measure the coefficient of static friction of magnetic tape over a range of temperatures and relative humidities.

The solution:

A device using a strain gage to measure the force of friction between a reference surface and the tape drawn at a constant velocity of approximately 0.0001 inch per second relative to the reference surface. At a constant velocity of this small magnitude, the difference in value between static and kinetic friction is negligible for practical purposes.

How it's done:

The device is mounted so that the test surfaces are enclosed in an environmental chamber. A sample of tape to be tested is clamped at its upper end to a cantilever spring containing a strain gage. The base of the cantilever spring is mounted on the drive block of a motor-driven lead screw mechanism. The tape, with a precision weight secured to the lower end, is suspended over a rounded face block made of any desired metal. For testing the tape against other materials, a film of the desired material can be wrapped around the metal block and held in tension by a weight. A thermocouple is embedded in the metal block close

(continued overleaf)

to the test surfaces which are enclosed in the test chamber. The environment in this chamber can be controlled at temperatures ranging from 0° to 120°C and relative humidities from 1 to 90 percent.

When the drive block is moved upward at the 0.0001 ips rate, the strain gage output will rise to a steady maximum value. This output is amplified and converted (by calibration) to the value of the friction load plus the suspended precision weight in ounces. By the use of a simple equation the coefficient of friction can then be determined for any frictional load.

Notes:

1. This device can also be adapted to measuring kinetic friction.

2. An inductance transducer may be used in place of a strain gage.
3. Inquiries concerning this device may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B67-10586

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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(GSC-10360)